Introduction to Context Analysis

Pre-work 1

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What is Context Analysis?

The traditional route

Traditionally, computer application software requirements have been determined through the use of interview-based requirements gathering activities. The activities centered on identifying the users to interview, and then asking what functionality they would like to see in the system. Obviously, the process was rather unstructured and learning occurred in a random fashion. Each interviewee concentrated on their particular interest or current problem, often relating very detailed information to an analyst who was not yet familiar with the given environment.

Purpose of context analysis

Context Analysis is used to bring focus and direction to the initial portion of the requirements gathering activity. It is specifically designed to help the analyst build a framework for the subsequent requirements definition activities. Good analytical techniques always provide a mechanism for building frameworks and then progressively and systematically overlaying the details.

Further, appropriate tools help control and bring order to the information exchange process, which is crucial to successful requirements gathering. The tool employed in support of Context Analysis is called a *Context Diagram* or *Entity Diagram*. Entity diagramming is not a technical science, with exacting rules and regulations. The intent is to provide a graphical tool to aid in the understanding of the work environment.

What is context?

Context can be defined as the environment in which an organization performs a number of activities involving one or more distinct groupings of individuals for the purpose of achieving one or more organizational objectives.

While context analysis explores relationships between individuals and groups within an environment, *context diagrams do not* reflect order or sequence of actions. Another graphical tool, the task flow diagram, is used to show sequence of activities.

Components of Context Analysis

Entities and transactions

Context diagrams contain two components: *entities* and *transactions.*

Entities may be individual people, such as Accounts Payable Clerks, or groups of people, such as the Accounts Payable Department. They may be inside the organization or outside the organizations, such as vendors. They are active participants in the process, not simply passive conduits used to transmit or convey information or physical objects. Entities are represented by ovals, with the name of the entity stated inside the oval.

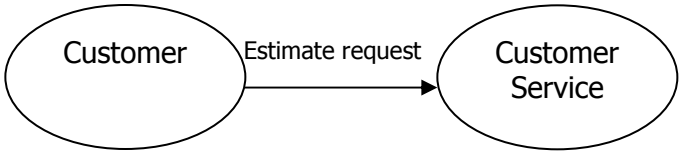
Let's look at an example. This example refers to the process of a customer getting an estimate on car repairs.

The first thing that happens is that the customer goes to the repair shop and speaks to a customer service representative about the repair needs. We have two entities—the customer and the customer service department -- which could be represented like this:

Entities relate to one another through ***transactions***. Entities perform actions on transactions that alter the content of the information or physical objects being passed around the organization.

Transactions are represented by arrows with the head of the arrow pointing to the entity to which the transaction is being directed. The foot of the arrow originates from the entity sending the transaction. Transactions should be labeled to indicate the general content of the information.

Therefore, we can add the following transaction arrow to our example:



The picture above shows the very beginning of a context diagram.

How to Develop a Context Diagram

How context diagrams are developed

The end objective of the context analysis is the development of a context diagram describing a single process with all its entities and transactions. We begin, as in the example above, with the identification of two entities involved, and the delineation of the transactions representative of the relationship between them for a given business process. Once this relationship has been described, the analyst can then ask for the name of another entity involved in the environment, and the transactions linking it to the other two entities. The process is simply repeated until a complete description of the environment emerges.

Advantages of this approach

This approach has several advantages:

- It allows all the key participants to get a feel for the overall environment. In many instances the key users associated with each internal entity understand their own particular contribution to the environment, but may not have a good understanding of the role played by the other entities involved. Joint development of the context diagram encourages and promotes a global rather than local view and understanding on the part of each participant.
- It focuses the project on the overall environment and objectives rather than individual parts. In essence, it helps develop a macro rather than micro project view, which puts all the participants on the same team, rather than competing with each other to have their needs met.
- This approach speeds up the requirements gathering process because it creates an environment for the orderly progression of areas to be explored. It avoids "random walks" though the requirements gathering process.
- It reinforces the delineation of overall purposes and objectives for the environment, rather than each individual entity's sub-objective.

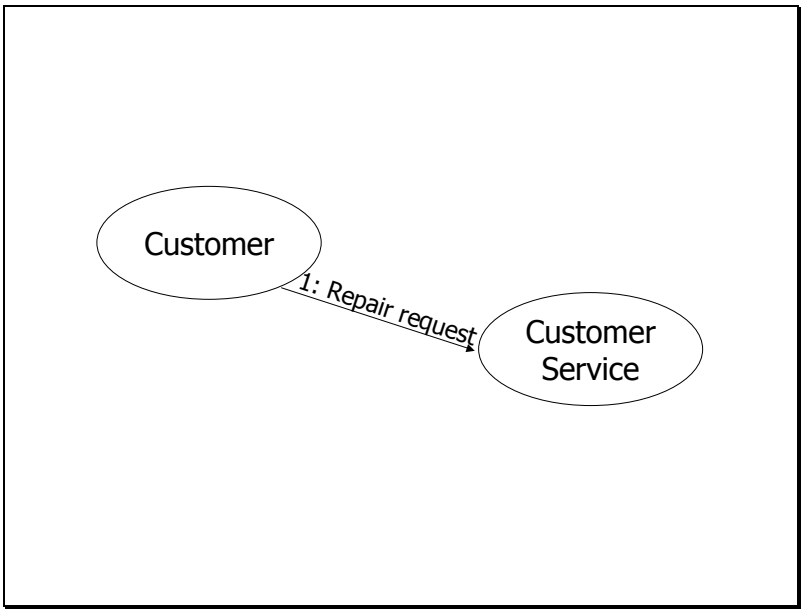
Requirements to complete the context diagrams

In order to create context diagrams that are complete and accurate, we must have the following:

- A Work Group that collectively has a good understanding of the process being described.
- The Work Group must participate in one or more group sessions, because discussion is required to make sure that the process is correctly diagrammed and everyone understands the diagram. Therefore, context diagrams are best completed in a collaborative groups environment, rather than in a series of one-on-one interviews with SMEs.

An example of context diagramming

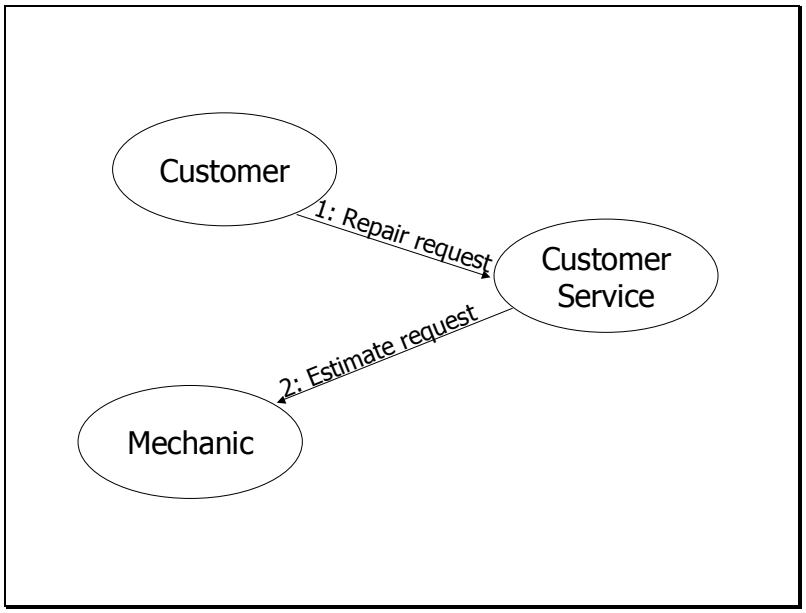
Let's develop our repair example, which so far looks like this:



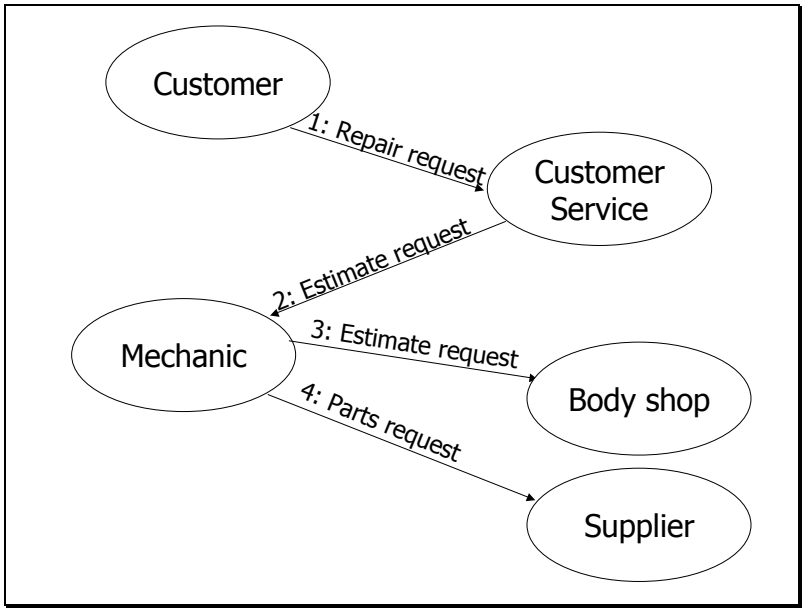
The logical next question is, "What does the Customer Service Department do with the request when it is received?" The response is that the customer service representative communicates the specifics of the job to a mechanic.

* *Note: The transactions in this example are numbered to make it easier for you to follow the sequence in which the diagram is developed, but often context diagrams cannot be numbered so neatly, due to multiple parallel subsets of transactions.*

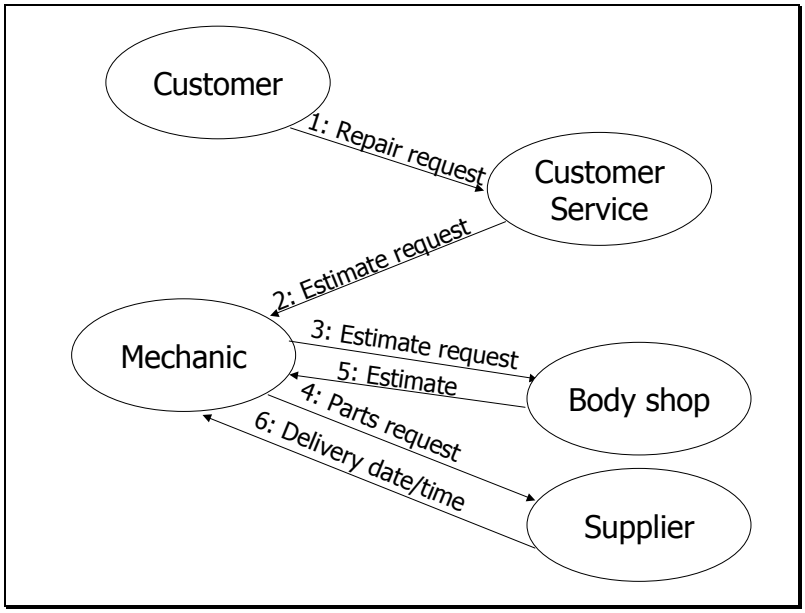
Thus there would be a transaction between the Customer Service Department and the mechanic as follows:



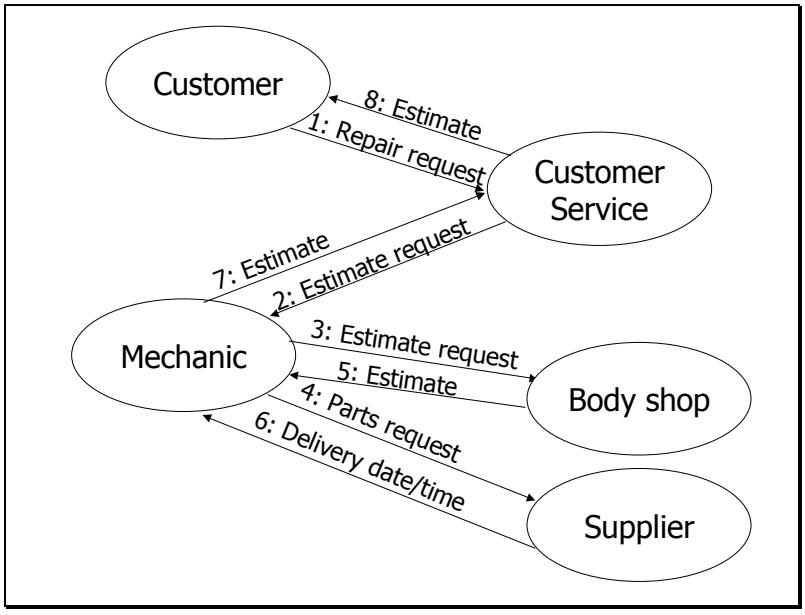
The facilitator, a business analyst, continues to develop the diagram by asking the Work Group a series of questions. The next question, "What does the mechanic do with the request?" generates the response that mechanic determines the work required and asks two other entities—a body shop and a parts supplier—for additional information. The body shop must perform some of the work as a contractor, and the parts supplier must commit to when they can send any needed parts. At this point, our diagram looks like this:



Again, we ask: "What do the body shop and parts supplier do with the mechanic's request?" Although there might be some internal processes in the body shop, the next two transactions are sending estimates back to the mechanic. The addition of these two transactions would look like this:



Additional discussion reveals that the mechanic takes this information, along with his/her own assessment of additional parts and labor, and sends the completed estimate back to customer service, who then calls the customer with the final estimate, like so:



The customer now has the estimate that was requested and can make a decision whether to approve the work. Thus, the diagram is complete.

The overall objective is to get the customer an estimate, and the transaction showing customer service representative giving the estimate to the customer represents the achievement of the objective. This diagram would be a part of a larger Context Diagram if the entire repair cycle, from estimate to completion of repairs to paying of the bill was studied. However, our objective in this case was to delineate the environment associated with the estimation process.

When context diagramming is complete

As we saw in the example above, the business analyst and Work Group must make a decision about what to include in the diagram and what should rightfully be part of a new diagram for a different process.

Just how do you know when you're done, or that the diagram completely represents the process of interest? Normally, the users will confirm completion of the overall structure by indicating there are no other entities to add to the description of the environment. It is usually clear when you reach this point. It is more difficult to evaluate whether or not the transaction set is complete. The following suggestions can help determine the adequacy of the transaction set, however they do not guarantee completion. Fortunately, the task flow diagram step (see companion reading) will provide additional feedback on the adequacy of the transaction set, and additional transactions can be added at that point. Still, before declaring the context analysis complete it is helpful to review the work product from the following perspectives:

<u>For each transaction pointing towards an entity is there a corresponding transaction generated by the entity as a result of some activity performed by the entity?</u> Transactions can be viewed as "triggers" for specific work activities within a given entity that produce work products distributed to one or more other entities. If an incoming transaction does not logically trigger an outgoing transaction, one of three things is true: (1) The diagram is complete and the objective of the process has been met. (2) You don't completely understand the environment. The resultant outgoing transaction is present on the diagram, but you don't understand how the incoming transaction triggers the creation of the outgoing transaction. (3) One or more transactions need to be added to the diagram.

Do all *external* entities have at least one transaction arrow with an internal entity? In any process under consideration the external entities must be directly related to the process being studied. For example, if the organization we are describing has a vendor from which we purchase items, we are not interested in that vendor's subcontractors, nor normally will the organization of interest have a direct relationship with the subcontractor. This is really a boundary rule that prevents us from trying to describe a whole industry or economy, rather than the specific business process.

Do all entities both receive and send transactions? Normally entities will both receive and send transactions if they are an active participant in the environment being described. Any entity not both receiving and sending should be inspected for missing transactions.

Although not fool proof, these suggestions will enable the analyst to develop a good feel for the level of completion. Most diagrams meeting the criteria indicated about are complete enough for the requirements gathering tasks. No diagram will ever perfectly represent the activity within a target environment, nor is it necessary to do so. If the users are satisfied regarding the description, and the three questions posed above can be answered in the affirmative, you are ready to proceed to the next step in the analysis.

Summary

The purpose of the Context Diagramming at the Project Definition level is to gain a "first-cut" look at the players involved and the key ways in which they interact. A context diagram is developed, relying on input from the key user with supplemental information gathered as required. The diagram is intended to represent a high level business view of the domain.

Once the diagram fairly describes the process it should be reviewed by the key users in a walk through and reviewed by QA.

As a member of the Work Group, you will have an experienced business analyst to facilitate the development of context diagrams, but it is helpful for you to have a general understanding of why and how they are created.
